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Individual Competition and Group Competition as Motivation Factors at the High School Level

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INDIVIDUAL COMPETITION AND GROUP COMPETITION AS
MOTIVATING FACTORS AT THE HIGH SCHOOL LEVEL

by
Earl Berke

A Thesis Submitted to the Faculty of the Graduate School of
Loyola University in Partial Fulfillment of
the Requirements for the Degree of
Master of Arts

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LIFE

Earl Berke was born in Chicago, Illinois, September 13, 1931.

He was graduated from John Marshall High School, Chicago, Illinois, June, 1949, and from Roosevelt University, June, 1953, with the degree of Bachelor of Arts.

From 1953 to 1955, the author was in military service. Following this, he held employment as a vocational counselor, and teacher. He began part-time graduate studies at Loyola University in February, 1958. He is presently employed as a teacher of English at Lane Technical High School, Chicago, Illinois.

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CHAPTER I

STATEMENT OF THE PROBLEM

This study is concerned with the question of whether individual competition or group competition situations are more effective in motivating high school students to learn. Such a study might prove valuable in several ways. It might suggest the following: 1) modification of education techniques in group situations; 2) additional light on other factors affecting the relationship between these two variables and high school achievement; 3) help in establishing areas of validity in the works of other researchers like Maller, Deutsch, and others.

The hypothesis of this study is, group competition is more effective in motivating high school students to learn, than is individual competition; that is to say that group competition will produce more work per unit of time than individual competition.

The area of human motivation is so highly complex and inclusive, that theoretically the entire field of human behavior could be included under this heading. There are a number of

reasons why the study of human motivation is complex and difficult. First, motivation is concerned with the "why" rather with the "how" of human behavior. In other words, its problem is one of explanation and causation, not simply one of description. Second, it is always a total organism in a social environment that responds or reacts, not just one segment of it. Third, motives can only be inferred from behavior; they are not directly observable. For example, although a number of people may exhibit very similar behavior, the underlying factors or motives governing the behavior of each person may be quite different. Moreover, persons with essentially similar motives may express them in markedly different ways. Fourth, the "why" of a specific act may be due primarily to physiological factors or to social factors or more often, to the interaction of the two. Frequently, it is difficult to differentiate the relative significance of these determinants.

CHAPTER II

REVIEW OF RELATED LITERATURE

At present, the two principal sources of information relevant to this question of individual competition versus group competition are psychological experiments and anthropological studies of various human cultures. This study is concerned primarily with a psychological experiment in which the effectiveness of these two kinds of motives is compared.

A study which closely parallels the present one is that of J.B. Maller.¹ Maller sought to measure the effect of personal and social motivation, i.e., of cooperative and competitive motives upon the work efficiency of American school children.

Maller exposed 1,538 subjects to three different conditions of motivation: a control condition (relatively unmotivated); a competitive condition, and a cooperative condition. The task to be performed by the subjects was to complete as many simple problems in addition as possible within a given time.

¹Julius B. Maller, "Cooperation and Competition", Contr. to Educ., CCCLXXIV (May 1929).

In general, Maller's data suggest that for American school children the competitive motive is stronger than the cooperative motive.

While it is not the particular purpose of the present study to investigate cultural differences in this regard, it is pertinent to mention briefly certain anthropological studies. Mead reports in considerable detail on the Kwakiutl Indians, who present an excellent example of a people whose culture is characterized by an extreme emphasis upon competitive behavior, and the Zuni Indians whose culture stresses cooperation.²

Every aspect of Kwakiutl life is oriented to the basic drive for prestige, which is maintained and augmented by the possession of property. In marked contrast to the Kwakiutl, according to Mead, are the Zuni Indians of New Mexico, who have no rigid class or caste distinction. Some families are wealthier than others, but there is no particular social emphasis attached either to wealth or poverty.

This study brings to light, cultural influences on the behavior patterns of groups of people. It alerts the author to the possibility of cultural influences affecting the performance of the students involved in the present study. Although

²Margaret Mead, Cooperation and Competition Among Primitive Peoples (New York, 1935).

the group of subjects in this study is fairly homogeneous in terms of academic backgrounds and intelligence levels, there may be variations in each student's own environment that can cause variations in the patterns of performance. Home and society situations may bias the results of performance. Another example might be the group mindedness of people living in Russia today.

From an experimental study of work effectiveness, it was found by Sorokin and others, that other things being equal, "individual remuneration" stimulates a greater effectiveness of work than does "group remuneration".³

Experimentation was first made with a group of pre-school children from three to four years of age. Later with three high school boys from thirteen to fourteen years of age. The objective of the experiment was unknown to them.

In the first series of experiments, the pre-school children's work consisted of running and carrying marbles from one point to another. The work of the high school boys consisted of carrying water pails from one place to another; of filling the pail with sand and carrying it to a certain place; and finally computing a list of points on paper and performing the operations of addition, subtraction, multiplication,

³Pitrim Sorokin et al., "An Experimental Study of Efficiency of Work Under Various Specified Conditions", Amer. J. Soc., XXXV (March 1930), 765-782.

and division of a series of arithmetical problems given in a specially prepared list.

It was found for both age level groups that: 1) the work of an individual child for himself is more effective than his work for a friend or for others. 2) The effectiveness of work or the amount of help to other individuals decreases with an increase of social distance between the helper and the helped. 3) "Unequal remuneration"⁴ stimulates a greater effectiveness of work in a group than does "equal remuneration."⁵

Sorokin's experiment supports data to the effect that competitive motives are stronger than cooperative motives for people of these ages and for tasks of these kinds. It is reviewed here in order to display an anticipated contrast in view of the present study. It appears to suggest that the present study will indicate that group goal performance is more effective than individual goal performance, where older people are concerned.

Perlmutter and de Montmollin state, in a study involving twenty-three undergraduate university students in France, that in learning nonsense syllables, group learning is superior to individual learning.⁶ It was found that groups require more

⁴Ibid.

⁵Ibid.

⁶Howard Perlmutter and Germain de Montmollin, "Group Learning of Nonsense Syllables," J. Abnormal Soc. Psychol., XLVII (July 1952), 762-769.

time to recall during early trials, but that they have a higher over-all recall rate than do individuals. In concluding, they stress superiority of group effort in learning, but state that it is difficult to predict whether groups in particular cases will be superior to particular individuals in making less errors, or requiring more or less time.

The contrast that this study shows in comparison to the foregoing, could possibly be a result of the individual learning subjects feeling defensive and experiencing an amount of mental blocking which impeded their performance. This experiment lends to the support of the hypothesis of the present study, which suggests that among high school students, group effectiveness of performance is superior to individual effectiveness of performance.

Forlano, in a study of cooperative behavior in children, found a tendency for the average child to work with greater enthusiasm for personal gain than for the sake of helping his group.⁷ The task was to cross out e's in a simple cancellation test. His experiment was patterned along the line of Maller's. Forlano's investigation involved thirty-four school children with a median school age of six and a median M.A. of twelve years and eight months. This is another experiment

⁷George Forlano, "An Experiment in Cooperation," J. Educ. Res., XXV (February 1952), 128-131.

reviewed to show additional contrast to the present study, when young children are used as subjects for similar experimentation. Here Forlano's study lends support to Maller's. It is interesting to note that here too, school children had been used as subjects, and the results were similar. Worthy of thought at this point is that children are less apt to feel self-conscious about their abilities than do adults.

McCurdy and Lambert show evidence of performance in their study with adults that indicates that in their particular study, individual effectiveness of performance is superior to group effectiveness of performance.⁸ In their experiment, thirteen groups of three persons each, and eleven individuals separately were given a complex task to perform. This task consisted of changing the positions of from one to six switches which were wired in such a way that a light flashed on when the pattern of switch positions tallied with that of a master control board. The subjects were scored according to the number of correct patterns completed within a specified time period. In the three-person groups, each subject was responsible for two switches, whereas individual subjects had six switches. The three-person group's progress depended on the quality of each person's performance on the task.

⁸Harold G. McCurdy and William E. Lambert, "The Efficiency of Small Human Groups in The Solution of Problems Requiring Genuine Cooperation," J. Pers., XX (July 1952), 478-94.

The authors found that individual scores were markedly superior to those of the three-person groups. It was suggested that a group may have at least one or two members who are sufficiently careless concerning experimental instructions to make errors in their performance.

It appears that children may function more effectively in individual-goal competitive situations than do adults, and adults may function more effectively in group-goal competitive situations than do children. Further, in an ideal group, where every individual contributes his own productive capacity, collective solutions should generally be superior to individual efforts.

The following reviews of experiments with adults appear to lend substance to these ideas. Shaw, Deutsch, Taylor and Faust, and Horwitz display evidence favoring group effectiveness over individual effectiveness.

The results of a study by M.E. Shaw, support the view, that groups seem assured of a much larger proportion of correct solutions than individuals do.⁹ This seems to be due to the rejection of incorrect suggestions, and checking of errors in the group. In erroneous solutions (where it is possible to determine the exact point at which the first error was made)

⁹Marjorie E. Shaw, "A Comparison of Individuals and Small Groups in The Rational Solution of Complex Problems," Amer. J. Psychol., XLIV (July 1952), 491-504.

groups do not err so soon as the average individual does.

Shaw divided a group of psychology students into two halves. The first half was composed of two groups of four women each, and three groups of four men each. At the same time nine men and twelve women were working on the same problems individually in the same room. The rationale for the segregation of the sexes is that it would make for better cooperation and smoothly operating groups. The tasks given were rather lengthy; hence for the sake of brevity, a well known example will be sufficient. On one side of a river are three wives and their husbands. All the men, but none of the women can row a boat. The problem is to get them to the other side of the river in a boat carrying only three persons at a time.

The results of this point up the superior effectiveness of the individual's contributions to collective solutions over the individual's efforts for himself, and adds strength to the hypothesis of the present study.

In further support of the superiority of group effectiveness, Deutsch presents certain carefully stated hypotheses regarding the effect of competition and cooperation on social process.¹⁰ The results regarding most of the activities were

¹⁰Morton Deutsch, "The Effects of Cooperation and Competition Upon Group Process," Group Dynamics: Research and Theory, eds. Dorwin Cartwright and Alvin Zander (Evanston, Ill., 1953), pp 318-352.

found to favor cooperative behavior. In connection with individual competition versus individual cooperation, Deutsch set up an experiment in which ten groups of students, each group consisting of five members, were instructed to act as a board of human relations experts. Their task was to analyse and discuss as groups, puzzle problems, and human relations problems. With reference to learning, Deutsch states that, "the cooperative group members in three of the five pairs rated themselves as learning more from discussion of the human relations problems than did the competitive members rate themselves."¹¹ Although the differences found were not statistically significant, Deutsch stated that the trend appeared to be in favor of individual cooperation.

The group competition condition of the present study somewhat parallels the cooperation situation of Deutsch's study. In the present study, the subjects are working together (but individually) supposedly in competition with another class.

In keeping with the foregoing ideas, the following experiment by Taylor and Faust is discussed.¹² It was found that group performance was superior to individual performance. Taylor and Faust used 105 psychology students to solve problems which

¹¹Ibid.

¹²Donald W. Taylor and William L. Faust, "Twenty Questions: Efficiency in Problem Solving as a Function of Size of Groups," J. Exp. Psychol., XLIV (August 1952), 360-368.

were popularized on radio and television programs, in which various objects were to be identified as animal, vegetable, or mineral. The subjects were divided into fifteen individual respondents, fifteen groups of two members, and fifteen groups of four members. All were given four problems a day for four consecutive days. A question of importance here concerns the relative efficiency in problem-solving as determined by the size of the group. The performance of the groups of four was not superior to that of groups of two, except that the groups of four had fewer failures. In terms of time required for the solution of problems, the performance of groups of two was superior to that of groups of four. This points up the question of optimum-size for the solution of group problems.

Horwitz contributes additional evidence to group dynamics which can be used to support the present study and others mentioned in this review.¹³ He states that when an individual knows that he can perform a task or achieve a goal only by cooperating with others, his determination to work with a group increases markedly.

The measurement device employed in his experiment is an adaptation of Zeigarnik's now well-known method of recall of interrupted tasks. The subjects of the task were sorority

¹³Morris Horwitz, "The Recall of Interrupted Group Tasks: An experimental Study of Individual Motivation in Relation to Group Goals," Hum. Relat., VII (April 1954), 3-38.

women placed into eighteen groups, each group consisting of five members, and assigned the task of working together on jigsaw puzzles. At a point approximately midway through each task, the subjects voted on whether or not the group should complete it. After the votes were taken, work on the problems was either halted, partly completed, or fully completed.

Horwitz found that when the group agreed to complete a task, the members became motivated to reach the group's goal. He concludes that group productivity in solving problems is not primarily affected by the goals of the individual members, but by their desire to see the group as a whole achieve its collective ends.

In summarizing, it can be said, that studies conducted with young children indicate superiority of individual performance over group performance. Worthy of consideration is the possibility that children may tend to feel defensive and experience an amount of mental blocking which impedes their performance in the group situation. This is not to say that the same factors may not be operating in adults, but that generally speaking, they probably affect adults to a lesser degree.

In contrast, a number of studies in group performance which have been described, favor the view that the group tends to be superior to the individual. These studies attribute the group's superiority to specific social processes, notably the

evaluation of solutions by many individuals, and rejection if they are not correct.

The studies favoring the superiority of the group over the individual, support the hypothesis of the present study. The communication of ideas, coordination of efforts, friendliness, and pride in one's group which are basic to group harmony and effectiveness, appear to be disrupted when members see themselves competing individually for mutually exclusive goals.

CHAPTER III

PROCEDURE

Twenty high school students were given the task of learning to identify nonsense syllables under three conditions: a control condition, and two experimental conditions, namely, individual competition and group competition. The scores for the subjects are their number of correct examples done per period of three minutes under the control conditions and each of the experimental conditions. Data are tallied and analysed as necessary to apply a "t" test to determine any significant group differences. Findings are discussed and appropriate conclusions drawn.

The task performed by the subjects was the identification of as many nonsense syllables as possible within a given time. All subjects involved were exposed to three different conditions of motivation. The subjects used in this were twenty Chicago public high school students, male, ages fifteen to sixteen, with I.Q.'s ranging between 95 and 105 on the Kuhlmann-Anderson Intelligence Scale. Each student was at the sophomore level, and all were fellow classmates. The students were given lists of nonsense syllables for each of the three conditions intro-

duced.

On the initial day of experimentation, a control condition was introduced first; an individual competition condition next, and a group competition condition last. On the following day and each day thereafter, for a total of six days, the subjects were exposed to six possible combinations of the three situations. The purpose of this of course was to equalize practice effects.

The examples were presented to the subjects on printed sheets.¹ There were fifteen nonsense syllables on each sheet numbered from one to fifteen. Below the group of numbered syllables was a list of unnumbered syllables and next to these, blank spaces wherein the student entered the number corresponding to the same syllable in the above list. All students were given two work-sheets for each condition, which contained more than enough examples to keep them occupied for the entire performance period. The same lists were used for all three conditions.

Originally a two minute time limit was selected arbitrarily by the author to determine its adequacy as a performance period for the experiment. After a number of trials using various time limits, it was decided that a three minute time limit would be adequate. This allowed the subject enough time for getting well into the task.

¹See Appendix.

The control condition (relatively unmotivated) was employed to learn how fast each student would work when he was not subject to the effect of any special type of motivating social stimulation. In this case the students were given only these instructions: "Do not write your name on this paper. This is only for practice. Write the word practice at the top. You should feel completely at ease and under no pressure." Each work-sheet under the control and group competition conditions had a code number for each student, enabling the author to identify the subjects' work-sheets that did not have names.

Under the individual competition condition, the subjects were given the following instructions: "You are now going to have a speed and accuracy contest to find out your speed and accuracy of performance on a special task. This test will tell us who is the fastest worker, the second fastest, third fastest, and so on to the very slowest worker in the class. Prizes will be given to those who will do the fastest work. Every one of you will have a good chance to win a prize. When I say 'go' you will start the exercise and continue until I tell you to stop. The harder and more carefully you work, the higher your score will be."

Under the group competition condition, the instructions were as follows: "This is to find out which class in the school is the fastest, second fastest, third fastest, fourth, and so on until the very slowest one. Class prizes will be given to those classes which will do fast and accurate work. This class

has a good chance to win a prize. The classes that will not try will naturally be at the bottom of the list. The score for your class will be the number of correct examples all of you do for your class. Although each of you is working on this task without assistance, all of you are really working together in a joint effort to carry this class to victory over the other classes in the contest."

CHAPTER IV

RESULTS AND DISCUSSION

The statistical results of the present study reveal the following mean scores: The mean score for the group competition condition is 583.95; the mean score for the individual competition condition is 578.35, and the mean score for the control condition is 454.20. There is no significant difference between the results of the two experimental conditions in-so-far as effectiveness of motivating the students of the present study is concerned.

The following tables contain all of the pertinent data. The first table contains the combined raw scores, means, and standard deviations for each condition.¹ The second table contains the standard error of each mean, and "t" scores for each condition.²

In attempting to check on the significance of these findings, a "t" test was applied. Comparison of the means for the

¹vide, TABLE I p.20

²vide, TABLE II p.21

TABLE I

RAW SCORES, MEANS, AND STANDARD DEVIATIONS OF
GROUPS LEARNING TO IDENTIFY NONSENSE
SYLLABLES N=20

Group	Raw Score	M	SD
Control	9,084	454.20	156
Individual Competition	11,567	578.35	174
Group Competition	11,679	583.95	194

TABLE II

IMPORTANT STATISTICS IN PERFORMANCE OF GROUPS
LEARNING TO IDENTIFY NONSENSE SYLLABLES
N=20

Group	M	σ_m	"t"
Control	454.20	34.88	where t_0 vs. $t_1 = 2.14$
Individual Competition	578.35	38.90	where t_1 vs. t_g "t" = .066
Group Competition	583.95	43.38	where t_g vs. t_0 "t" = 2.26

two conditions of competition yielded a "t" of .066. This is of course not significant even at the .05 level of significance where a "t" of 2.09 is required. When the mean of the control group was compared with the mean for individual competition, "t" was found to be 2.14 and when the control condition mean was compared with that for group competition, a "t" of 2.26 resulted.

It is apparent then that: 1) there is no significant difference in performance and learning between the individual competition conditions and group competition conditions for subjects involved in this study, and 2) the difference between the two experimental conditions and the control conditions is significant at the .05 level of significance.

A cooperative atmosphere, such as one in which individuals of a group cooperate while competing with another group, appears to result in somewhat greater productivity in a given learning task than is the case where members are in competition with each other individually.

Although other researchers have claimed that mutual acceptance, contribution, and high morale brought about by cooperativeness and friendliness, result in increased motivation, and greater productiveness, and suggest that competition arouses fear and anxiety, and tends to disorganize learning, the present research does not conclusively substantiate their claims. This may be due to the type of design used for this

experiment. Perhaps for the purposes of this study, a matched group design would have yielded results more like those of the other researchers. Perhaps the whole idea of counter-balancing is questionable. There appears to be growing literature in this field which implies this.

Another factor might be the smallness of the sample as well as the possible limitations of counter-balancing.

The psychology underlying the impairment of learning in individual competition situations is relatively simple. Excessive competition may put people on the defensive. It may put each member in a position of defending his own ideas tenaciously, and of finding means of retaliation. The preservation of the individual's ideas and opinions tends to become a goal in itself. Learning occurs as a result of change and readjustment in the individual, but may be adversely affected by a threatening situation. In such a situation, an individual might revert to an earlier form of adjustment, such as negativism or withdrawal. The more threatening a situation, the more likely or the greater the tendency for the members to leave the field altogether.

The fear of rejection on the other hand, not only impairs the learning process, but discourages individual thinking and creativeness and places a premium on conformity.

Most of the studies reviewed as well as the present study appear to suggest that group participation is not necessarily more conducive to learning than is individual effort, but that

learning is apt to be less efficient in groups in which participation is limited, than in groups where it is specifically encouraged.

CHAPTER V

CONCLUSIONS

Analysis of the results of the present study have lead the author to the following conclusions:

- 1) There is no significant difference in performance and learning between the conditions of individual competition and group competition for subjects involved in this study.
- 2) The differences between the control conditions and the two experimental conditions are significant at the .05 level of significance.
- 3) In view of the findings of other researchers where significant differences did exist concerning the group vs. the individual, the results of this study point up the possibility of error in the manipulation of the various conditions, and the need for further investigation.

The results of group effort and individual effort are far less conclusive than many writers have implied. Even though the results are not conclusive, generally speaking, they favor group learning over individual learning.

It appears that a teacher of high school students might do well in creating an atmosphere of group competition or team-

work in the learning situation. Teamwork might to some extent lead to increased activity and interaction among the students, and hence, greater achievement for each student involved. As a member of a group or team, each student would sense the need on his part to make a contribution to the group in order that the group might achieve its goals.

CHAPTER VI

SUMMARY

The present study involved the task of learning to identify nonsense syllables under three conditions; a control condition, and two experimental conditions, namely, individual competition and group competition.

Analysis of the data indicate that: 1) There is no significant difference in performance and learning between the conditions of individual competition and group competition for subjects involved in this study; and 2) the differences between the control conditions and the two experimental conditions are significant at the .05 level of significance.

The findings presented here indicate that group effort may not always be superior to individual effort in learning, but generally speaking, they favor group learning over individual learning.

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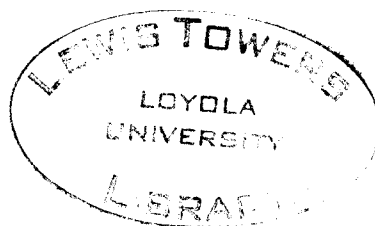
(SAMPLE WORKSHEET)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
BAF	DAF	FEK	HIB	JYI	KCH	LUJ	REJ	WOX	YED	ZIH	ZIX	BIW	ZUR	ZUX

HIB	DAF	KCH	WOX	ZUR	ZIH
KCH	LUJ	YED	BAF	HIB	BIW
ZIH	DAF	JYI	HIB	ZUR	ZIH
DAF	ZUX	FEK	WOX	KCH	WOX
KCH	REJ	ZIX	ZUR	JYI	DAF
BAF	BAF	REJ	HIB	WOX	LUJ
LUJ	KCH	BAF	DAF	YED	JYI
ZUX	BIW	ZIH	ZIH	ZUX	REJ
ZIX	YED	LUJ	HIB	DAF	DAF
HIB	ZIH	JYI	WOX	LUJ	ZIH
YED	HIB	DAF	DAF	BAF	ZUX
WOX	JYI	ZUX	FEK	FEK	WOX
REJ	ZUR	HIB	JYI	BIW	FEK
FEK	KCH	YED	BAF	ZIH	JYI
BIW	DAF	ZUR	BIW	JYI	DAF
FEK	ZUR	HIB	FEK	YED	KCH
ZIH	ZUR	LUJ	REJ	HIB	BAF
KCH	ZUX	FEK	ZIX	REJ	ZUR
FEK	WOX	BIW	KCH	ZUX	JYI
ZIX	BAF	HIB	YED	BAF	ZIH
JYI	BIW	DAF	KCH	ZUR	REJ
YED	DAF	HIW	HIB	FEK	BIW

ORDER IN WHICH CONDITIONS
WERE ADMINISTERED EQUA-
LLY OFTEN TO SUBJECTS
N=20

DAY	FIRST	SECOND	THIRD
1	Control	Individual	Group
2	Individual	Group	Control
3	Group	Control	Individual
4	Group	Individual	Control
5	Individual	Control	Group
6	Control	Group	Individual



APPROVAL SHEET

The thesis submitted by Earl Berke has been read and approved by three members of the Department of Psychology.

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

June 6, 1962
Date

Edmund P. Marx
Signature of Adviser